

Executive Summary

The U.S. electricity transmission system is an extensive, interconnected network of high-voltage power lines that transport electricity from generators to consumers. The transmission system must be flexible enough, every second of every day, to accommodate the nation's growing demand for reliable and affordable electricity.

The transmission system was built over the past 100 years by vertically integrated utilities that produced and transmitted electricity locally. Small interconnections between neighboring utilities existed, but they were created to increase reliability and share excess generation. Over the past 10 years, we have introduced competition into wholesale electricity markets to lower costs to consumers by spurring needed investments in generation and increasing the efficiency of operations. Today, our transmission system acts as an interstate highway system for wholesale electricity commerce.

There is growing evidence that the U.S. transmission system is in urgent need of modernization. The system has become congested because growth in electricity demand and investment in new generation facilities have not been matched by investment in new transmission facilities. Transmission problems have been compounded by the incomplete transition to fair and efficient competitive wholesale electricity markets. Because the existing transmission system was not designed to meet present demand, daily transmission constraints or "bottlenecks" increase electricity costs to consumers and increase the risk of blackouts.

Eliminating transmission constraints or bottlenecks is essential to ensuring reliable and affordable electricity now and in the future. The Department of Energy (DOE) conducted an independent assessment of the U.S. electricity transmission system and found that:

- Our U.S. transmission system facilitates wholesale electricity markets that lower consumers' electricity bills by nearly \$13 billion annually.
- Despite these overall savings, interregional transmission congestion costs consumers hundreds of millions of dollars annually. Relieving bottlenecks in four U.S. regions (California,

PJM, New York, and New England) alone could save consumers about \$500 million annually. Savings could be even greater because DOE's analysis does not capture all of the factors, such as impacts on reliability, that result from bottlenecks.

- Introducing advanced transmission technologies and improved operating practices, siting generation closer to areas where electricity is needed, and reducing electricity use through targeted energy efficiency and distributed generation could all help reduce transmission congestion.
- Better utilizing existing facilities can help delay the need for new transmission facilities, but it cannot avoid construction of new transmission facilities entirely.

Much work is needed to address transmission bottlenecks and modernize our nation's transmission systems. As a percentage of total energy use, electricity use is growing.² This reflects the transformation of our economy to an increasingly sophisticated, information-based economy, one that relies on electricity. Electricity, though, is not a commodity that can be stored easily. Our transmission infrastructure is at the heart of our economic well-being. Imagine an interstate highway system without storage depots or warehouses, where traffic congestion would mean not just a loss of time in delivering a commodity, but a loss of the commodity itself. This is the nature of the transmission infrastructure. That is why bottlenecks are so important to remove and why an efficient transmission infrastructure is so important to maintain and develop.

This report outlines 51 recommendations that will help ensure a robust and reliable transmission grid for the 21st century. The following are six general recommendations:

- First, we must increase regulatory certainty by completing the transition to competitive regional wholesale markets.
- Second, we need to develop a process for identifying and addressing national-interest transmission bottlenecks.

²In 1970, electricity accounted for 8 percent of total U.S. energy use. In 2000, electricity accounted for 16 percent of total U.S. energy use. Source: Energy Information Administration. *Annual Energy Outlook 2002*. Download from <http://www.eia.doe.gov>

- Third, we can avoid or delay the need for new transmission facilities by improving transmission system operations and fully utilizing our existing facilities. Regional planning processes must consider transmission and non-transmission alternatives when trying to eliminate bottlenecks.
- Fourth, opportunities for customers to reduce their electricity demands voluntarily, and targeted energy-efficiency and distributed generation, should be coordinated within regional markets.
- Fifth, ensuring mandatory compliance with reliability rules must include enforceable penalties for non-compliance that are commensurate with the risks that the violations create.
- Sixth, DOE will take an increased leadership role in transmission R&D and policy by creating a new Office of Electricity Transmission and Distribution.

Action is needed now to put this study's recommendations in place. Private industry and federal, state, and local governments must work together to ensure that our electricity transmission system will meet the nation's needs for reliable and affordable electricity in the 21st century.